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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/756,953	01/13/2004	Christian Peter Behrenbruch	13595 US	3305
23719 7590 05/02/2007 KALOW & SPRINGUT LLP 488 MADISON AVENUE 19TH FLOOR NEW YORK, NY 10022			EXAMINER TORRES, JOSE	
			ART UNIT 2624	PAPER NUMBER
			MAIL DATE 05/02/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/756,953

Applicant(s)

BEHRENBRUCH ET AL.

Examiner

Jose M. Torres

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>06/10/2004</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "410" has been used to designate both "Re-execute image registration step" and "Display new image and calculate diagnostic parameters step" in Figure 4. Reference character "410" should be replaced with -- 412 -- for the "Display new image and calculate diagnostic parameters step" in Figure 4.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 1 is objected to because of the following informalities: in line 1 "steps of:-" should be -- steps of: --. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the temporal behaviour" in line 5, and "the level of agreement" in line 8. Examiner recommends replacing the terms with "a temporal behaviour" and "a level of agreement" in lines 5 and 8 respectively. There is insufficient antecedent basis for these limitations in the claim.

Claims 2-16 are dependant upon claim 1.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 14 and 15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claim limitation "A computer program" in claim 14 is directed towards program code *per se* which is functional descriptive material and considered statutory subject matter only when embodied or recorded on a computer readable medium, therefore it is non-statutory. Examiner

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recommends replacing the limitation with "A computer readable storage medium carrying a computer program which causes a computer to execute". Claim 15 is dependant upon claim 14.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-5 and 11-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Smith (US 2004/0064037).

Re claims 1, 15 and 16: Smith et al. disclose a method/computer program (FIG. 3, "software 48")/computer readable storage medium (FIG. 3, "storage medium 46")/dynamical medical image processing apparatus (FIG. 3, "system 40") of dynamic imaging a subject (Paragraphs [0046] and [0048]) comprising the steps of: obtaining a plurality of time separated images of the subject (FIG. 1, "patient 20", Paragraph [0032], [0034] and [0039]); registering the plurality of time separated images together to match corresponding locations in the images to each other ("spatially aligned", Paragraph [0067]); measuring from the registered images the temporal behaviour ("percent change in intensity") of an imaged

region at a location in the subject (Paragraphs [0060] and [0072]; and comparing the measured temporal behaviour with a model of the expected temporal behaviour ("baseline data") of the imaged region to determine the level of agreement ("cancerous, suspect, or normal") therebetween as a measure of the quality of the registration of the time separated images (The measured data is compared with the baseline data, and comparison concludes whether the tissue is cancerous, suspect, or normal. Also, the behaviour of the data is being measured in time to determine the percent of change for further comparison with the baseline data. Paragraphs [0065]-[0072]).

Re claim 2: Smith disclose the use of an imaging agent ("Contrast agent") and said model is a model of the temporal behaviour of the imaging agent (The baseline data includes known results, which is the percent change of intensity. Paragraphs [0034], [0069] and [0072]).

Re claim 3: Smith disclose the imaging agent is a contrast agent ("Contrast agents", Paragraph [0034]).

Re claim 4: Smith disclose the level of agreement between the measured temporal behaviour and the expected temporal behaviour is displayed (The level of agreement is shown as the colors representing the cancerous tissue ("red") and suspect tissue ("green"). Paragraph [0080]).

Re claim 5: Smith disclose the level of agreement is displayed overlying an image of the subject (FIG. 7A, "parametric image **90**", Paragraph [0080]).

Re claim 11: Smith disclose the model is a temporal model of the take-up and wash-out of an imaging agent administered to the subject (The baseline data corresponds to values similar to those shown in FIG. 4. Paragraphs [0059]-[0060]).

Re claim 12: Smith disclose the subject is a living human, animal or plant (FIG. 1, "patient **20**", Paragraph [0032]).

Re claim 13: Smith disclose the images are acquired by one of magnetic resonance imaging ("MRI"), computed tomography ("CT"), positron emission tomography ("PET"), single photon emission computed tomography, nuclear medicine, ultrasound ("ultrasounds"), x-ray ("x-rays") and optical imaging (Paragraph [0026]).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Suri (US 6,718,055). The teachings of Smith have been discussed above.

As to claim 6, Smith does not explicitly disclose re-executing the step of registering the plurality of time separated images together in imaged regions where the level of agreement is poor.

Suri teaches, re-executing the step of registering the plurality of time separated images together in imaged regions where the level of agreement is poor (The convergence is determined by minimizing the entropy or disorder among successively smaller sub-sets. "convergence is not achieved", Col. 6 lines 26-59).

Therefore, in view of Suri, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Smith's method/system by incorporating the motion correction algorithm taught by Suri to repeat the process when a convergence between the calculated transformation matrix with the previous is not achieved, where the transformation matrices corresponds to the comparison of the image volumes (pre and post contrast images), in order to perform image correction on images where motion was induced during collection caused by respiration, muscle flex and the like (Col. 5 lines 21-25 and 37-56).

As to claim 7, Smith fails to disclose the registration uses a parameterized process and is re-executed using different registration parameters.

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Suri teaches the registration uses a parameterized process and is re-executed using different registration parameters (Down sampling, size reduction and smoothing. Col. 6 lines 38-41).

As to claims 8 and 9, Smith fails to disclose the registration is re-executed at different resolution and scale.

Suri teaches the registration is re-executed at different resolution and scale (Different image sizes and multi-resolution. Col. 5 lines 37-56, Col. 6 lines 26-41 and Col. 8 lines 13-27).

11. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Suri as applied to claim 6 above, and further in view of Hossack et al. (US 6,360,207). The teachings of Smith modified by Suri have been discussed above.

As to claim 10, Smith modified by Suri fails to disclose the registration comprises searching through a search window defined in one of the images and the registration is re-executed using a different sized search window.

Hossack et al. teaches the registration comprises searching through a search window defined in one of the images and the registration is re-executed using a different sized search window (Col. 25 lines 40-67).

Therefore, in view of Hossack et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Smith and Suri by incorporating the method step of adaptively changing the search area into a

smaller or larger search area and re-execute the image registration in order to speed up the search for estimated motions and obtain a high degree of confidence when the detected motions exhibit little variations (Col. 25 lines 40-67).

Conclusion

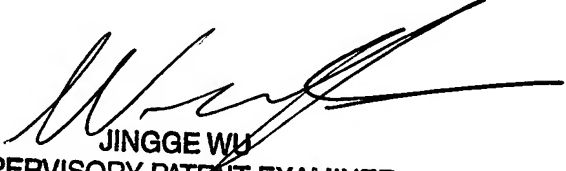
12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Clune et al. disclose Methods and Systems for Correcting Image Misalignment, Positano et al. disclose an Automatic Time Sequence Alignment in Contrast Enhanced MRI by Maximization of Mutual Information, Weese et al. disclose a Method and Device for the Registration of Images, Gilhuijs et al. disclose a Method, Computer Program Product, and Systems for the Automated Analysis of Lesions in Magnetic Resonance, Mammogram and Ultrasound Images, and Wyman et al. disclose a System and Method for Determining Convergence of Image Set Registration.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jose M. Torres whose telephone number is 571-270-1356. The examiner can normally be reached on Monday thru Friday: 8:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JMT
04/23/2007



JINGGE WU
SUPERVISORY PATENT EXAMINER